

## CASE REPORT

## Sudden worsening after subdural haematoma surgery: will there be a corpus callosum injury?

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**SUMMARY**

We report a case of mild encephalopathy with a reversible splenial lesion (MERS) which occurred after chronic subdural haematoma (CSDH) surgery. The patient was admitted to our hospital for drowsiness and marked asthenia. The cerebral CT scan revealed a CSDH and surgery allowed to improve the symptoms, but after several days we observed a sudden worsening. The patient developed left-sided myoclonic seizures followed by left hemiplegia and worsening drowsiness. Electrolytes imbalance and inflammatory causes were excluded. The CT scan showed a right cerebral swelling and the subsequent MRI revealed a single lesion in the splenium of the corpus callosum, hyperintense on diffusion-weighted images. After osmotic therapy the patient improved and on day 10 of admission the MRI showed a complete resolution of the lesion. This is the first report that described an association between CSDH and MERS. Possible aetiopathogenetic mechanisms are discussed.

**BACKGROUND**

Mild encephalopathy with a reversible splenial lesion (MERS) is a rare disease defined radiologically as a lesion in the corpus callosum involving at least the splenium. Pathognomonic signs of MERS on MRI are T2 signal prolongation and restricted water diffusion with decreased apparent diffusion coefficient values in the splenium.<sup>1</sup>

Two types of MERS are described. Type 1 is characterised by an isolated reversible lesion in the corpus callosum. In type 2, the lesion is extended to the entire corpus callosum and may involve the surrounding white matter.<sup>2</sup>

The aetiopathogenesis is still debated. Viral infections and genetic factors leading to an electrolyte-water imbalance are usually reported. In our experience, a reversible splenial lesion occurred after surgery for evacuation of a chronic subdural haematoma (CSDH) in a healthy adult man.

**CASE PRESENTATION**

A 52-year-old immunocompetent man was hospitalised for drowsiness and marked asthenia. The patient presented with a Glasgow Coma Scale (GCS) of 15 and no cognitive impairment was detected. The neurological examination showed no sensory or motor deficits.

The clinical history revealed a progressively worsening headache which occurred about 1 month before. Neither comorbidities nor previous infections were reported. The cerebral CT showed a

right-sided CSDH with significant midline shift (figure 1A).

The haematoma was immediately evacuated (figure 1B) and the postoperative course was uneventful. Suddenly, on the fourth day after surgery, he had a stroke-like worsening consisting of drowsiness, fever and left-sided myoclonic seizures. After 4 h, we observed a left hemiplegia.

Inflammatory markers (white cell count, C reactive protein and procalcitonin) and electrolytes (performed daily until clinical improvement) were within normal limits. The ECG was performed while the twitches were present which allowed to exclude a status epilepticus.

The cerebral CT revealed a right-sided brain swelling with increased midline shift (figure 1C). After a few hours we decided to perform MRI that showed a severe vasogenic brain oedema and a corpus callosum lesion (figure 2A–D).

**INVESTIGATIONS**

- ▶ The cerebral MRI showed brain oedema and a single lesion in the corpus callosum characterised by T2 signal prolongation and restricted water diffusion with decreased apparent diffusion coefficient values (figure 2A–D).
- ▶ The subsequent cerebral MRI, performed after clinical recovery of the patient, showed the complete resolution of the splenial lesion (figure 2E–H).

**DIFFERENTIAL DIAGNOSIS**

The differential diagnosis of MERS includes acute disseminated encephalomyelitis, ischaemia, infections, traumatic injury, multiple sclerosis, posterior reversible encephalopathy syndrome, lymphoma and extrapontine myelinolysis.

The clinical and radiological courses were consistent with the diagnosis of MERS. We supposed that MERS was a direct consequence of the brain swelling hence the other hypothesis was excluded.

**TREATMENT**

We decided to perform an osmotic therapy that allowed to quickly improve the symptoms. We used dexamethasone 16 mg/day for 1 week that led both to reducing of the cerebral swelling and the resolving of the splenial lesion.

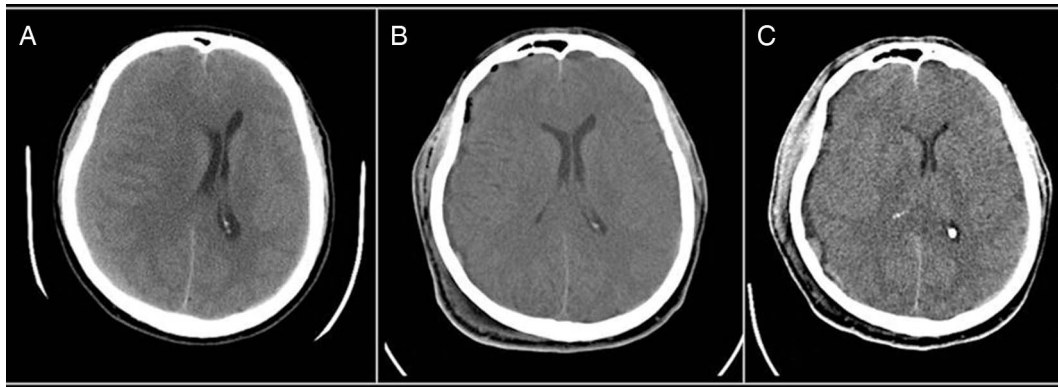
**OUTCOME AND FOLLOW-UP**

Patients with MERS generally recover completely.<sup>3</sup> As a matter of fact, our patient showed a good outcome and he was discharged after 15 days without neurological deficits. The postoperative



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**Figure 1** Cerebral CT scan showing a chronic subdural haematoma with midline shift (A). Postoperative CT scan after 1 day (B). Four days after surgery, the CT scan showed a cerebral swelling (C).

long-term follow-up (6 months) was uneventful and the cerebral MRI did not reveal any lesion.

## DISCUSSION

CSDH presents a high incidence, especially in the elderly.<sup>4</sup> Surgery is usually mandatory and prognosis is generally good. In our case, we observed an unexpected clinical worsening after surgery. The patient did not present risk factors usually related to CSDH surgery failure. As a matter of fact, the anamnesis was negative for antiplatelet and anticoagulant therapy, bleeding diathesis and other cardiovascular or haematological disorders. We performed MRI to exclude vascular events, but we observed a severe brain oedema associated to an unexpected likely MERS.

The stroke-like occurrence of the symptoms may be due to the vasogenic oedema that acted as a trigger event for the MERS onset. We supposed that the corticosteroids allowed to improve the symptoms, because they were effective for the vasogenic oedema and the intramyelinic lesion.<sup>5</sup>

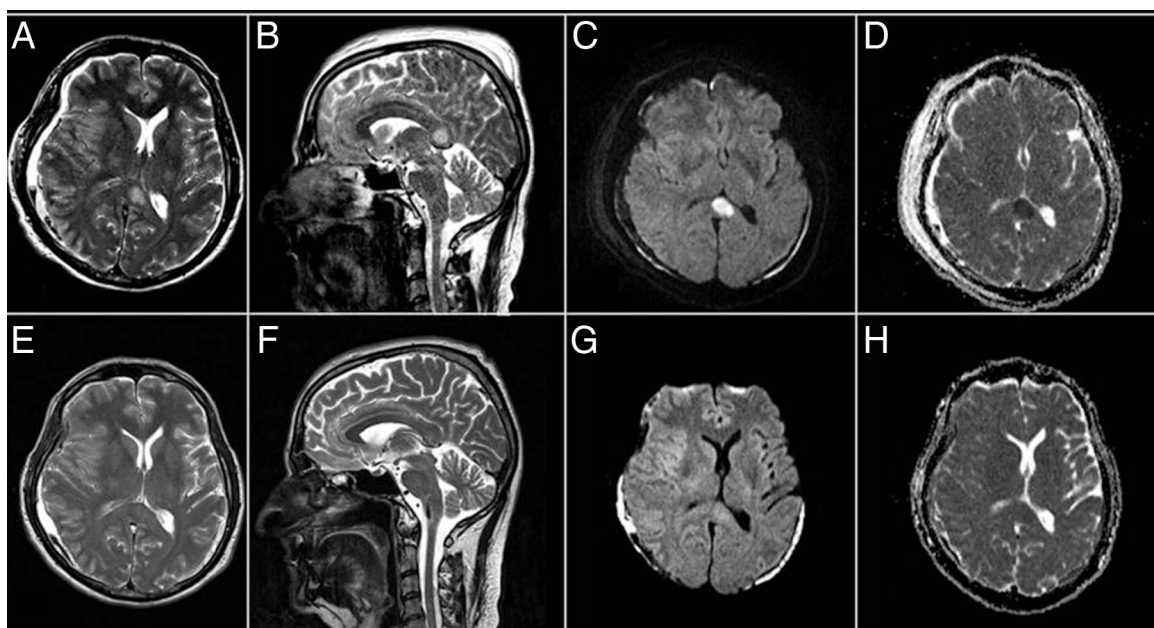
Patients harbouring MERS are usually affected by bacterial (*Salmonella enteritidis*, *Enterococcus faecalis*) or viral infections

(influenza A and B, Epstein-Barr virus, adenovirus and rotavirus).<sup>3</sup> However, in our patient neither bacterial nor viral infections were revealed.

Other non-infectious causes were described such as trauma, cerebellitis, hyponatremia, chemotherapy, antiepileptic drugs and high-altitude cerebral oedema.<sup>3-6</sup> Notebaert *et al*<sup>3</sup> in a recent study reviewed clinical, biochemical and microbiological data of patients with MERS and hypothesised that the variety of pathological events will expand in the future. As a matter of fact, our experience showed that MERS may be due to CSDH surgery.

The pathogenesis is still unknown. Some theories have been proposed including vascular impairment, direct viral invasion and arginine vasopressin suppression, but the mechanism of transiently splenic reduced diffusion is currently debated.<sup>7</sup> Intramyelinic oedema due to inflammatory infiltration and hyponatremia may be a trigger event.<sup>8</sup> This should lead to oxidative stress resulting in a reversible white matter lesion.<sup>6</sup>

In our case a significant cerebral swelling was observed after CSDH evacuation. Changes in the intracranial pressure and



**Figure 2** Axial and sagittal T2-weighted and axial diffusion-weighted images (A–C) showing brain oedema and an high-signal lesion in the central splenium of the corpus callosum, apparent diffusion coefficient (ADC) map (D) showing considerably reduced ADC value. Three weeks after onset, T2-weighted images (E and F), axial diffusion-weighted image (G) and ADC map (H) showing a complete resolution of the lesions.

brain re-expansion may be related to that occurrence. We hypothesised that haemodynamic factors, such as sustained vasodilation, impaired cerebral autoregulation, elevated cerebral capillary pressure and induced hypoxia lead to cerebral oedema.

We suppose that the cerebral swelling was the main cause of the sudden clinical deterioration. Furthermore, we speculate that it might have acted as a trigger event for MERS occurrence as supposed in a case of high altitude cerebral oedema.<sup>6 9 10</sup> The resulting electrolyte–water imbalance could be responsible for the reduced diffusion observed in MRI.

### Learning points

- ▶ Clinical worsening after chronic subdural haematoma (CSDH) evacuation is usually due to the occurrence of a status epilepticus, electrolyte disorders and infectious agents. We speculate that cerebral swelling, which may lead to mild encephalopathy with a reversible splenial lesion, should be hypothesised as a possible reversible complication in case of neurological deterioration after CSDH surgery.
- ▶ A diffusion-weighted MRI allows to easily detect splenial lesions.
- ▶ The osmotic therapy may lead to achieving a complete recovery.

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**Patient consent** Obtained.

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